voltage measured across said positive and said negative electrodes of said cell;

the method being characterized by;

electrically coupling a controller between said electrodes of said cell and said terminals of said container to form, from the cell voltage, an output voltage across the positive and negative terminals of the container;

in response to detection of a predetermined condition of the battery substantially determined by said internal impedance, uncoupling the output voltage of the controller from the terminals of the container.

REMARKS

1. Reconsideration and further prosecution of the above-identified application are respectfully requested in view of the amendments and discussion that follows. Claims 1-12, 14-22 and 24-29 are pending in this application. Claims 1-7 and 24-27 have been rejected under 35 U.S.C. §103(a) as being obvious over U.S. Patent No. 5,783,322 to Nagai et al. Claims 12, 14-22, 28 and 29 have been allowed. After a careful review, it has been concluded that the rejections are in error and the rejections are therefore traversed.

2. Claims 1-7 and 24-27 have been rejected as being obvious over Nagai et al. In specific, the Examiner asserts (Office Action of 4/4/02, page 3) that

"Applicant submits that Nagai clearly monitors voltage and that there is no mention of being responsive to a 'predetermined condition . . . substantially determined by said internal impedance' . . . the examiner maintains that Nagai meets this limitation. In Nagai, the internal impedance of the cell is inversely related to the detected voltage level. (Col. 9, lines 40-56) The impedance is lowered with the expected and detectable result of an increase in voltage. If in doing so the voltage level remains low or does not appreciably increase, the life of the cell is determined as fully consumed. Thus, it is considered that the predetermined condition of cell voltage is substantially determined by the internal impedance, in that the voltage level is increased with concomitant decrease in cell impedance. As Applicant submits and to which the examiner acquiesces, it is the increase in voltage (or lack thereof) that is detected by Nagai".

It is noted first that the Examiner appears to be mistaken with regard to the assertion that Nagai et al. teaches or suggests the use of any internal impedance of the cell. For example, col. 9, lines 40-56 refers to "impedance of the transistor FET2" (lines 41-42) and to "voltage across both ends of the resistor R0" (lines 45-46). Further, FIGs. 2, 4, 9, 10, 11, 12, 13, 14 and 16 of Nagai et al. explicitly show the resistor R0 as being within the controller 12 instead of being within the cell 11. Since Nagai et al. shows the resistor R0 as being within the controller 12 instead of within the cell 11, Nagai et al. does not meet the limitations of claims 1 or 24.

Further, a person of skill in the art would recognize that the resistor R0 of Nagai et al. would be different than the internal resistance of a cell. In this regard, a person of skill in the art would recognize that certain charge or discharge conditions within a cell can result a

variable internal battery impedance. For example, charging or discharging of a battery can result in gas bubbles (e.g., hydrogen) forming around the anode or cathode under conditions that are not related to a charge state. The presence of gas bubbles would be understood to inherently vary the internal impedance of the battery.

It is noted next that a controller adapted for use with primary and secondary batteries and used in conjunction with the internal impedance of a cell (as under the claimed invention) would accommodate the varying resistance and would inherently be structurally different than a controller that uses a fixed resistance (as under Nagai et al.). Since Nagai et al. does not teach or suggest the use of the internal impedance of a cell, Nagai does not teach each and every claim limitation.

During a discussion with Examiner Mercado on Friday, March 14, 2003, Examiner Mercado agreed (and confirmed with Mr. Katsut) that if it could be demonstrated that the claimed controller is structurally different than Nagai et al., then the claims (as amended) should be allowable. As demonstrated above, the controller of Nagai et al. is clearly structurally different than the claimed invention. Since the claimed invention is structurally different than Nagai et al. the rejection is now believed to be improper and should be withdrawn.

3. Allowance of claims 1-32, as now presented, is believed to be in order and such action is earnestly solicited. Should the Examiner be of the opinion that a telephone conference would expedite prosecution of the subject application, he is respectfully requested to telephone applicant's undersigned attorney.

Respectfully submitted,

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Marked-Up Claims

1. A battery having a controller suitable for use in batteries including a primary battery and a secondary battery, said battery comprising:

(a) a container having a positive and negative terminal;

(b) a battery cell having an ~~internal~~ internal impedance disposed within said container, said cell having a positive electrode, a negative electrode, and a cell voltage measured across positive and negative electrodes of said cell;

(c) a controller ~~adapted~~ adapted for use in primary and secondary batteries electrically coupled between said electrodes of said cell and said terminals of said container to form, from the cell voltage, an output voltage across the positive and negative terminals of the container; and

(d) a circuit responsive to a predetermined condition of said battery, the circuit begin operable to uncouple the output voltage of the controller from the terminals of the container upon detection of said predetermined conditions substantially determined by said internal impedance.

24. A method for extending the useful life of a battery comprising the steps of:

providing a battery having a controller [suitable] adapted for use in batteries including a primary battery and a secondary battery, said battery including:

(1) a container having a positive terminal and a

negative terminal; and

(ii) a battery cell having an internal impedance disposed within said container; said cell having a positive electrode, a negative electrode, and a cell voltage measured across said positive and said negative electrodes of said cell;

the method being characterized by;

electrically coupling a controller between said electrodes of said cell and said terminals of said container to form, from the cell voltage, an output voltage across the positive and negative terminals of the container;

in response to detection of a predetermined condition of the battery substantially determined by said internal impedance, uncoupling the output voltage of the controller from the terminals of the container.